

# Exr's Amelts.

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## What is claimed is:

1           1. A carbon nanocapsule supported catalyst~~§~~,  
2 comprising at least one kind of catalytic metal particle  
3 deposited on the carbon nanocapsule, wherein the carbon  
4 nanocapsule has the following formula:  $F(-M)_n$ , in which F  
5 is the carbon nanocapsule, M is the catalytic metal  
6 particle, and n is the number of the catalytic metal  
7 particle.

1           2. The carbon nanocapsule supported catalyst~~§~~ as  
2 claimed in claim 1, wherein the carbon nanocapsule is a  
3 polyhedral carbon cluster constituted by having a  
4 concentric multi-layers of closed graphitic sheet  
5 structure, and the diameter of the carbon nanocapsule is  
6 3-100 nm.

1           3. The carbon nanocapsule supported catalyst~~§~~ as  
2 claimed in claim 1, wherein the carbon nanocapsule is  
3 hollow.

1           4. The carbon nanocapsule supported catalyst~~§~~ as  
2 claimed in claim 1, wherein the carbon nanocapsule is a  
3 metal-filled carbon nanocapsule filled with metals, metal  
4 oxides, metal carbides, or alloys.

1           5. The carbon nanocapsule supported catalyst~~§~~ as  
2 claimed in claim 1, wherein n is 1-20.

1           6. The carbon nanocapsule supported catalyst~~§~~ as  
2 claimed in claim 1, wherein the catalytic metal particle

3 is a nanocluster, substantially constituting metal atoms,  
4 able to catalyze chemical reactions.

1 7. The carbon nanocapsule supported catalyst~~s~~ as  
2 claimed in claim 6, wherein the catalytic metal particle  
3 is a nanocluster constituting metals, metal oxides, metal  
4 carbides, metal nitrides, metal sulfides, alloys or  
5 combinations thereof.

1 8. The carbon nanocapsule supported catalyst~~s~~ as  
2 claimed in claim 7, wherein the catalytic metal particle  
3 is a nanocluster constituting Pt, Pd, Rh, Cu, Fe, Co, Ni,  
4 Au, Ru, Zn, Ti, Os, Mo, or Ag.

1 9. The carbon nanocapsule supported catalyst~~s~~ as  
2 claimed in claim 1, wherein the catalytic metal particle  
3 is an organic metal particle.

1 10. The carbon nanocapsule supported catalyst~~s~~ as  
2 claimed in claim 9, wherein the catalytic metal particle  
3 is  $\text{PtCl}_2(\text{NH}_2)_2$  or ferrocene.

1 11. The carbon nanocapsule supported catalyst~~s~~ as  
2 claimed in claim 1, wherein the catalytic metal particle  
3 M is deposited at a corner of the outermost graphite  
4 layer of the polyhedral carbon nanocapsules.

1 12. The carbon nanocapsule supported catalyst~~s~~ as  
2 claimed in claim 11, wherein the catalytic metal particle  
3 M is attach to those functional groups which were  
4 selective modified at the corners.

1           13. The carbon nanocapsule supported catalyst~~s~~ as  
2           claimed in claim 1, wherein the diameter of the catalytic  
3           metal particle is 1-20nm.

1           14. A carbon nanocapsule supported catalyst~~s~~,  
2           comprising at least one kind of catalytic metal particle,  
3           with a diameter of 1-20nm, deposited at a corner of the  
4           outermost graphite layer of the carbon nanocapsule,  
5           wherein the carbon nanocapsule has the following formula:  
6            $F(-M)_n$ , in which F is the carbon nanocapsule, M is the  
7           catalytic metal particle, and n, the number of the  
8           catalytic metal particle, is 1-20.

1           15. The carbon nanocapsule supported catalyst~~s~~ as  
2           claimed in claim 14, wherein the carbon nanocapsule is a  
3           polyhedral carbon cluster constituted by having  
4           concentric multi-layers of closed graphitic sheet  
5           structure, and the diameter of the carbon nanocapsule is  
6           about 3-100 nm.

1           16. The carbon nanocapsule supported catalyst~~s~~ as  
2           claimed in claim 14, wherein the carbon nanocapsule is  
3           hollow.

1           17. The carbon nanocapsule supported catalyst~~s~~ as  
2           claimed in claim 14, wherein the carbon nanocapsule is a  
3           metal-filled carbon nanocapsule filled with metals, metal  
4           oxides, metal carbides, or alloys.

1           18. The carbon nanocapsule supported catalyst~~s~~ as  
2           claimed in claim 14, wherein the catalytic metal particle

3 is a nanocluster, substantially constituting metal atoms,  
4 able to catalyze chemical reactions.

1 19. The carbon nanocapsule <sup>supported catalyst</sup> ~~catalyst support~~ as  
2 claimed in claim 18, wherein the catalytic metal particle  
3 is a nanocluster constituting metals, metal oxides, metal  
4 carbides, metal nitrides, metal sulfides, alloys or  
5 combinations thereof.

1 20. The carbon nanocapsule supported catalyst~~s~~ as  
2 claimed in claim 19, wherein the catalytic metal particle  
3 is a nanocluster constituting Pt, Pd, Rh, Cu, Fe, Co, Ni,  
4 Au, Ru, Zn, Ti, Os, Mo, or Ag.

1 21. The carbon nanocapsule supported catalyst~~s~~ as  
2 claimed in claim 14, wherein the catalytic metal particle  
3 is an organic metal particle.

1 22. The carbon nanocapsule supported catalyst~~s~~ as  
2 claimed in claim 21, wherein the catalytic metal particle  
3 is  $\text{PtCl}_2(\text{NH}_2)_2$  or ferrocene.